**WHAT IS CLAIMED IS:**

1. A phase shift mask having transmission properties that are dependent at least in part on an intensity of an incident light beam, the phase shift mask comprising:
   a mask substrate that is substantially transparent to the incident light beam, and
   a first phase shift layer disposed on the mask substrate, the first phase shift layer having a refractive index that is nonlinear with the intensity of the incident light beam, wherein the refractive index of the first phase shift layer changes with the intensity of the incident light beam on the phase shift mask.

2. The phase shift mask of claim 1 wherein properties of a light beam transmitted through the phase shift mask are proportional to the intensity of the incident light beam on the phase shift mask.

3. The phase shift mask of claim 1 wherein the first phase shift layer is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate.

4. The phase shift mask of claim 1 further comprising a second phase shift layer formed of at least one of molybdenum silicide, carbon, chrome oxide, chrome nitride, silicon nitride, chrome fluoride, and chrome oxide fluoride.

5. The phase shift mask of claim 1 wherein the first phase shift layer is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate, and further comprising a second phase shift layer that is formed of molybdenum silicide.

6. The phase shift mask of claim 1 wherein the mask substrate is formed of at least one of quartz, glass, calcium fluoride, diamond, diamond-like carbon, and fused silica.

7. An integrated circuit having a structure with feature sizes smaller than a wavelength of the incident light beam, the structure patterned with the phase shift mask of claim 1.

8. A method for making a phase shift mask, the method comprising the steps of:
applying a first phase shift layer to a substantially transparent mask substrate, the first phase shift layer selected from alkali metal titanyl phosphates,
applying photoresist to the first phase shift layer on the mask substrate,
developing the photoresist to provide a mask pattern,
etching the first phase shift layer according to the mask pattern, and
stripping the photoresist from the mask substrate to provide the phase shift mask, which exhibits a transmission that is dependent at least in part on an intensity of an incident light beam on the first phase shift layer.

9. The method of claim 8 wherein the mask substrate is formed of at least one of quartz, glass, calcium fluoride, diamond, diamond-like carbon, and fused silica.

10. The method of claim 8 wherein the first phase shift layer is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate.

11. The method of claim 8 further comprising applying a second phase shift layer to the mask substrate, the second phase shift layer formed of at least one of molybdenum silicide, carbon, chrome oxide, chrome nitride, silicon nitride, chrome fluoride, and chrome oxide fluoride.

12. The method of claim 8 wherein the first phase shift layer is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate, and further comprising a second phase shift layer that is formed of molybdenum silicide.

13. An integrated circuit having a structure formed with the phase shift mask made by the method of claim 8.

14. A method for making an integrated circuit, the method comprising the steps of:
applying photoresist to a layer on a substrate,
passing an incident light beam through a phase shift mask to produce a transmitted light beam, where the phase shift mask includes a mask substrate that is substantially transparent to the incident light beam, and a

first phase shift layer disposed on the mask substrate, the first phase shift layer having a refractive index that is nonlinear with an intensity of the incident light beam, wherein the refractive index of the first phase shift layer changes with the intensity of the incident light beam on the phase shift mask,

adjusting properties of the transmitted light beam as propagated through the first phase shift layer by adjusting the intensity of the incident light beam,

exposing the desired pattern in the photoresist with the transmitted light beam, where the adjusted properties of the transmitted light beam assist in producing the desired pattern,

developing the photoresist to provide an etching mask, and

etching the layer on the substrate to form a structure of the integrated circuit.

15. The method of claim 14 wherein the first phase shift material is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate.

16. The method of claim 14 wherein the mask substrate is formed of at least one of quartz, glass, calcium fluoride, diamond, diamond-like carbon, and fused silica.

17. The method of claim 14 wherein the phase shift mask includes a second phase shift layer that is formed of at least one of molybdenum silicide, carbon, chrome oxide, chrome nitride, silicon nitride, chrome fluoride, and chrome oxide fluoride.

18. The method of claim 14 wherein the first phase shift material is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate, and further comprising a second phase shift layer that is formed of at least one of molybdenum silicide, carbon, chrome oxide, chrome nitride, silicon nitride, chrome fluoride, and chrome oxide fluoride.

19. The method of claim 14 wherein the first phase shift material is formed of at least one of potassium titanyl phosphate and rubidium titanyl phosphate, and further comprising a second phase shift layer that is formed of molybdenum silicide.

20. An integrated circuit formed with the method of claim 14, the structure of the integrated circuit has feature sizes smaller than a wavelength of the incident light beam.